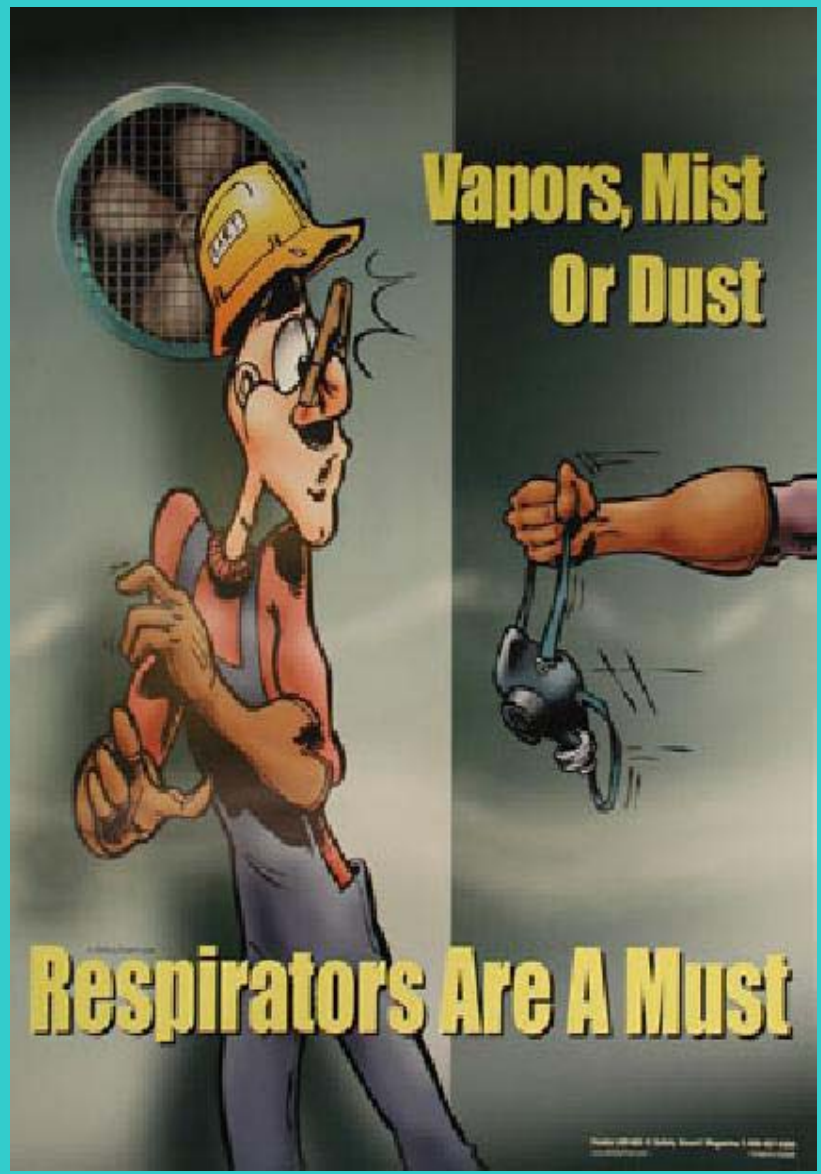
Respiratory Protection Training

Environmental Health and Safety



Outline

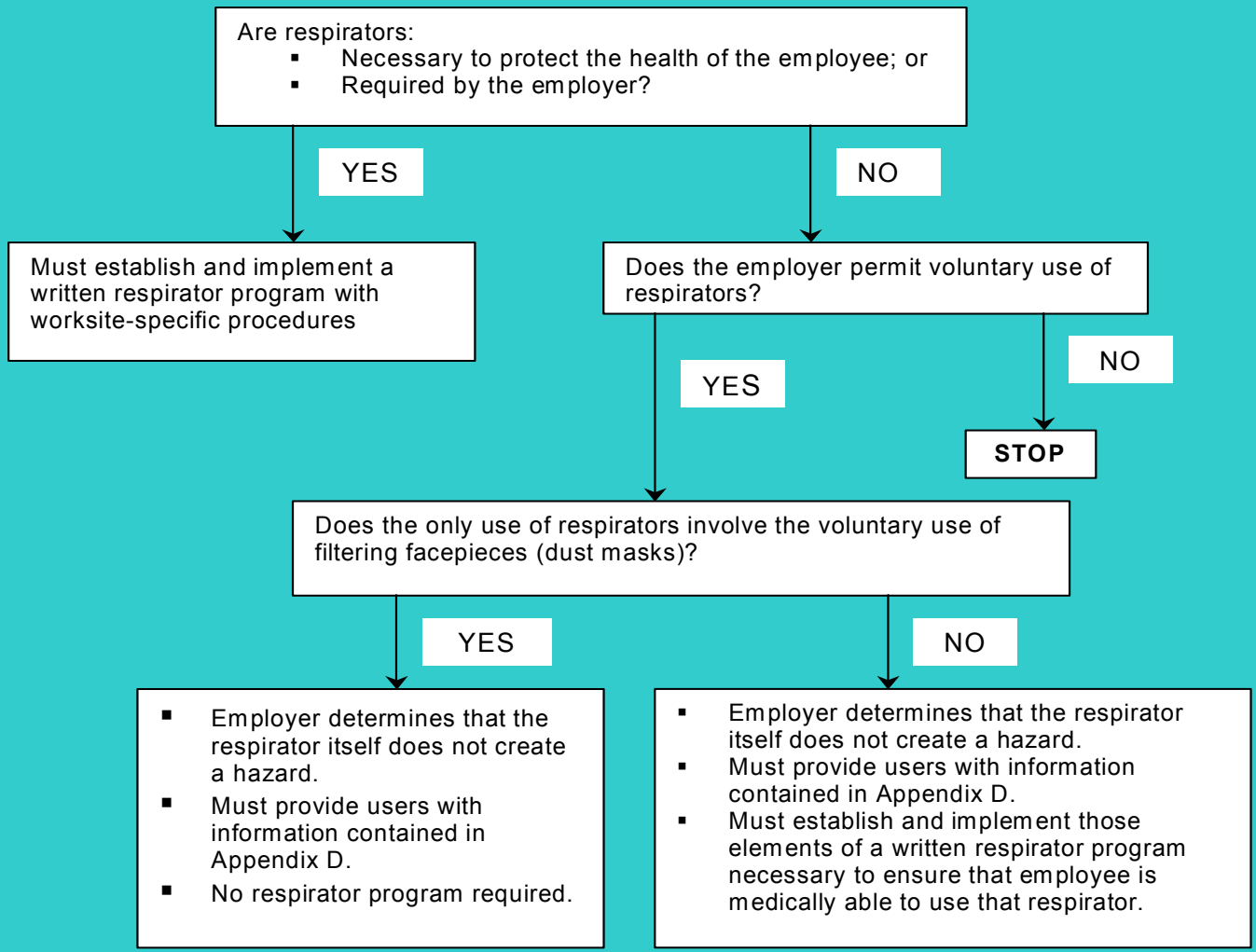
- **Classroom**

✓ Introduction
✓ Terminology
✓ OSHA Respiratory Program
✓ Quiz

- **Hands-On**

✓ Cleaning
✓ Inspection
✓ Fit checks

Respirator-Use Requirements Flow Chart
29 CFR 1910.134(c)



Voluntary vs Mandatory use of Respiratory Protection

Information for Employees using Respirators When Not Required Under the Standard

Respirators are an effective method of protection against designated hazards when properly selected and worn. Respirator use is encouraged, even when exposures are below the exposure limit, to provide an additional level of comfort and protection for workers. However, if a respirator is used improperly or not kept clean, the respirator itself can become a hazard to the worker. Sometimes, workers may wear respirators to avoid exposures to hazards, even if the amount of hazardous substance does not exceed the limits set by OSHA standards. If your employer provides respirators for your voluntary use, or if you provide your own respirator, you need to take certain precautions to be sure that the respirator itself does not present a hazard. You should do the following:

Voluntary vs Mandatory use of Respiratory Protection

1. Read and heed all instructions provided by the manufacturer on use, maintenance, cleaning and care, and warnings regarding the respirators limitations.

2. Choose respirators certified for use to protect against the contaminant of concern. NIOSH, the National Institute for Occupational Safety and Health of the U.S. Department of Health and Human Services, certifies respirators. A label or statement of certification should appear on the respirator or respirator packaging. It will tell you what the respirator is designed for and how much it will protect you.

3. Do not wear your respirator into atmospheres containing contaminants for which your respirator is not designed to protect against. For example, a respirator designed to filter dust particles will not protect you against gases, vapors, or very small solid particles of fumes or smoke.

4. Keep track of your respirator so that you do not mistakenly use someone else's respirator.

Training Goals

- You should understand the extent of the requirements of a respiratory protection program.

- You should understand the limitations of the program and your respirator.

Permissible Practices

- Engineering and administrative controls before respirators.
- Engineering: product substitution, minimization, isolation, ventilation.
- Administrative: scheduling or rotation of work.

A fume hood

and

paint booth

are examples of engineering controls

Exposure

- Exposure is the concentration of the air contaminant

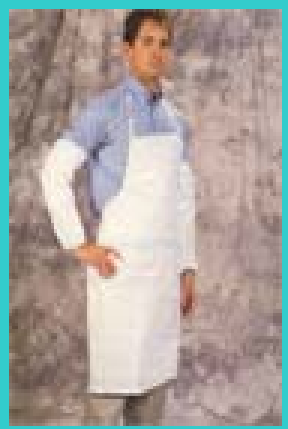
Exposure Assessment

example: hydrochloric acid

According to the MSDS for hydrochloric acid, recommended personal protective equipment should include:

- Chemical goggles, if respirator is not full face,
- Chemical resistant gloves,
- An impermeable apron or suite to avoid skin contact,
- Respiratory protection with chemical cartridges based on airborne levels of acid vapors

Exposure Assessment



- example: muriatic acid, recommended personal protective equipment should include:
  - ✓ Chemical goggles or face shield with chemical goggles,
  - ✓ Chemical resistant gloves.
  - ✓ Coveralls, boots, or impermeable apron to avoid skin contact.
  - ✓ Respiratory protection based on airborne levels of contaminants.

Exposure Acronyms

- **PEL- (Permissible Exposure Limit)**: Established by OSHA, the permissible concentration in air of a substance to which nearly all workers may be repeatedly exposed 8 hours a day, 40 hours a week, for 30 years without adverse effects.

- **TWA- (Time Weighted Average):** Concentrations of contaminants that have been weighted for the time duration of sample. A sufficient Number of samples are needed to permit a time-weighted average concentration throughout a complete cycle of operations or throughout the work shift.

- **STEL- (Short Term Exposure Limit):** Maximum concentration for continuous 15-minute period. Allowed 4 times a day, with at least 60 min. Between exposures.

Exposure Acronyms

- **C- (Ceiling Limit):** Control of exposure to fast-acting substances by value placing a limit on their concentration. The concentration of these substances cannot at any time in the work cycle (except for a 15-min. period) exceed the TLV.

- **TLV-(Threshold Limit Value):** An exposure level under which most people can work consistently for 8 hours a day, day after day, with not harmful effects. TLVs are listed as either an 8-hours TWA or a 15-min. STEL.

- **IDLH-(Immediately Dangerous to Life and Health):** Any atmosphere that poses an immediate hazard to life or poses immediate debilitating effects on health.

- **AL-(Action Level):** A level of exposure at which the employer must initiate some actions such as medical monitoring and training.

Types of Respirators

Tight Fitting Respirators

Types of Respirators

Loose Fitting PAPR (Powered Air Purifying Respirator)

Loose fitting
PAPR helmet

Loose fitting
PAPR hood

Classes of Respirators

- **Positive Pressure Respirator-** When inhaling, the pressure inside the respirator is kept higher than outside the respirator.

- **Negative Pressure Respirator-** When inhaling, the pressure inside the respirator is less than outside the respirator.

Examples of Posititive Pressure Respirators

PAPR-Powered air-purifying respirators-(cannot be used in IDLH atmospheres)

Atmosphere supplying respirators (can be used in atmospheres where the hazard is unknown or IDLH)

- supplied air respirators (SAR)
- Self-contained breathing apparatus (SCBA)

Examples of Negative Pressure Respirators

Half-face cartridge respirator

N95 Particulate respirator

Full-face cartridge respirator

Filters and Cartridges

- Color coded for material filtered

- Made specific for a single manufactures line of respirators. For example, if you use a North brand respirator, you *MUST* use North brand filters and cartridges. You *CANNOT* use a filter or cartridge from another manufacture.

HEPA Filters and Combination Cartridges:

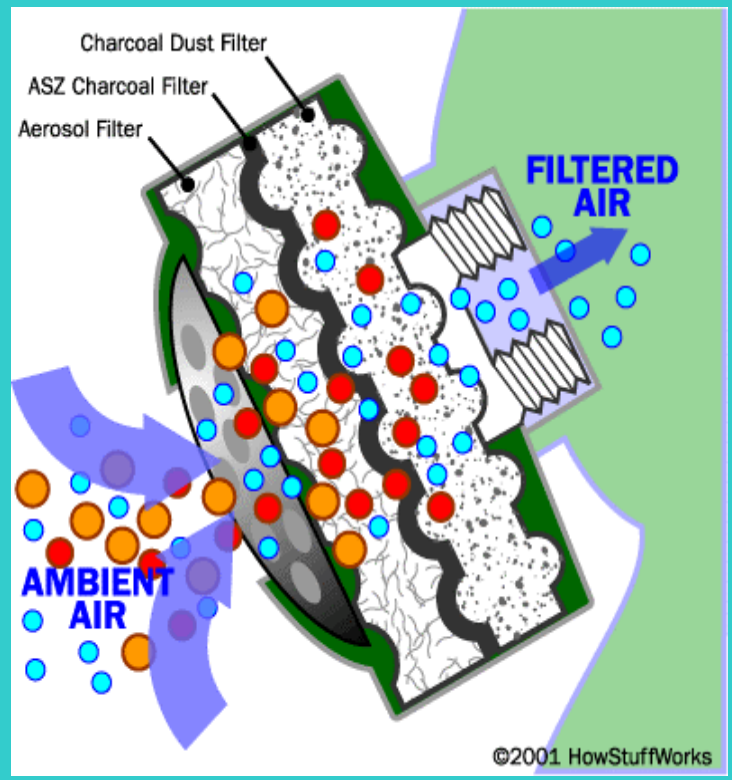
- High Efficiency Particulate Air- used to filter out particulates only

- Combination Cartridges-used to filter out particulates, gas and vapors

How Cartridges Work:

Any air filter can use one (or more) of three different techniques to purify air:

- Particle filtration
- Chemical absorption or adsorption
- Chemical reaction to neutralize a chemical



A typical disposable filter cartridge for a respirator: When you inhale, air flows through the inlet on the left, through a particulate filter, through an activated charcoal filter, through another particulate filter (to trap charcoal dust) and through the outlet on the right into the mask. When the particulate filter clogs or the activated charcoal becomes saturated, you must replace the cartridge.

Service Life

- The canisters or cartridges of air-purifying respirators are intended to be used until filter resistance precludes further use, or the chemical sorbent us expended as signified by a specific warning property e.g. odor, taste, end of service life indicator (ELSI), etc.
- Service life of cartridges and canisters need to develop change out schedules and depends on many variables:
    - Exertion level
    - Cartridge variability
    - Temperature
    - Humidity
    - Multiple contaminants

What are the ten parts of a respirator program?

1. **Administrator of the Program**-University Health Services, Occupational Medicine, Environmental Health and Safety.
2. **Medical Evaluation**-Conducted by University Health Service and Occupational Medicine.
3. **Selection of Respiratory Protection-**
   - Choose the right respirator to protect from contaminant-consult with EH&S.
   - Respirators must be NIOSH approved.
   - Evaluate workplace exposure, assume IDLH if contaminant is not known.
   - Air purifying respirators **cannot** be used in IDLH atmospheres.

What are the ten parts of a respirator program?

4. Training- Initial training required with periodic refresher training every year. The training shall encompass the following:

- Why the respirator is necessary and how improper fit, usage, or maintenance can compromise the protective effect of the respirator;
- What the limitations are;
- Use of respirator effectively in emergencies, including situations in which the respirator malfunctions;
- How to inspect, put on and remove, use, check the seals of the respirator;
- Maintenance and storage procedures;
- How to recognize medical signs and symptoms that may limit or prevent the effective use of respirators;
- General requirements of regulation

What are the ten parts of a respirator program?

5. Fit testing- for all tight fitting respirators annually, or if changes occur to facial features, weight gain/loss, eyewear changes, fit check fails

6. Inspection & care-

- inspect before each use
- replace defective parts immediately

7. Cleaning- after each use, disassemble and thoroughly clean and disinfect respirator

8. Use- inspect before using, proper storage, positive/negative fit check before each use, change filters according to change schedule or SOP

Negative pressure check

Positive pressure check

What are the ten parts of a respirator program?

9. **Review-** Periodic audits of the UR Respiratory Protection Program

10. **Record Keeping-**

- Written Respiratory Protection Program on EH&S website www.safety.rochester.edu located under "programs" in the Industrial Hygiene section
- Medical certifications
- Training records
- Fit test records
- Air monitoring records

Questions?

Contact Environmental Health and Safety at 275-3241